

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte SHIGEFUMI ODAOHARA

Appeal 2007-2147
Application 09/754,483
Technology Center 2100

Decided: November 30, 2007

Before JAMES D. THOMAS, ROBERT E. NAPPI,
and JEAN R. HOMERE, *Administrative Patent Judges*.

HOMERE, *Administrative Patent Judge*.

DECISION ON APPEAL
STATEMENT OF THE CASE

Appellant appeals under 35 U.S.C. § 134 from the Examiner's final rejection of claims 6 through 10, 12 and 13. Claims 1 through 5 and 11 have been canceled. We have jurisdiction under 35 U.S.C. § 6(b) to decide this appeal. We reverse.

The Invention

Appellant invented a voltage converter having a detection circuit for selectively activating a first power supply circuit or a second power supply circuit based on the amount of current supplied to these circuits. (Spec. 4.)

An understanding of the invention can be derived from exemplary independent claim 6, which reads as follows:

6. A voltage converter comprising

a first power supply circuit capable of converting an input voltage to an output voltage;

a second power supply circuit capable of converting said input voltage to said output voltage, wherein said second power supply circuit is connected in parallel with said first power supply circuit; and

a detecting circuit for activating either said first power supply circuit or said second power supply circuit to convert said input voltage to said output voltage based on an amount of current supplied to said first and second power supply circuits.

In rejecting the claims on appeal, the Examiner relies upon the following prior art:

Schaffer	US 5,498,984	Mar. 12, 1996
Ferry	US 6,150,798	Nov. 21, 2000

The Examiner rejects the claims on appeal as follows:

Claims 6 through 10, 12, and 13 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over the combination of Ferry and Schaffer.

First, Appellant contends that the combination of Ferry and Schaffer does not render claims 6 through 10, 12 and 13 unpatentable. Particularly, Appellant contends that the cited references do not teach or suggest a detecting circuit that activates a first power supply circuit or a second power supply circuit based on an amount of current supplied to the first and second power supply circuits.¹ (App. Br. 4-5.) Appellant further contends that one of ordinary skill in the art would not be motivated to combine the cited references since there is no teaching, suggestion, or motivation to combine the references as proffered by the Examiner. (Reply Br. 3.) In response, the Examiner contends that Ferry's disclosure of voltage regulator including a controller² for selecting a power supply circuit in combination with Schaffer's teaching of a current sense amplifier for detecting the magnitude of the current flowing from a battery to a load teaches the invention. (Ans. 6.) Additionally, the Examiner contends that the ordinarily skilled artisan would have been motivated to combine the teachings of Ferry and Schaffer to more efficiently detect the current flowing in the power supply circuits. (Ans. 4-5.)

¹ Appellant argues that Ferry selects a power supply circuit block based on signals at a load whereas the claimed invention requires that the selection be made based on the current supplied to the power supply circuits. (App. Br. 4.)

² The Examiner argues that Ferry's teaches a signal TU, which is indicative of the charge state of the battery with respect to a threshold value, and the current in the load is used to drive the first and second circuit blocks. (Ans. 6.)

ISSUE

The *pivotal* issue in the appeal before us is as follows:

Has Appellant shown³ that the Examiner failed to establish that the combined disclosures of Ferry and Schaffer render the claimed invention unpatentable under 35 U.S.C. § 103(a)? Particularly, does Ferry's disclosure of a converter including a controller for selecting a power supply circuit in combination with Schaffer's disclosure of a current-sense amplifier for detecting the magnitude of current in a device render the claimed invention unpatentable?

³ In the examination of a patent application, the Examiner bears the initial burden of showing a *prima facie* case of unpatentability. *In re Piasecki*, 745 F.2d 1468, 1472 (Fed. Cir. 1984). When that burden is met, the burden then shifts to the applicant to rebut. *Id.*; *see also In re Harris*, 409 F.3d 1339, 1343-44 (Fed. Cir. 2005) (finding rebuttal evidence unpersuasive). If the applicant produces rebuttal evidence of adequate weight, the *prima facie* case of unpatentability is dissipated. *Piasecki*, 745 F.2d at 1472. Thereafter, patentability is determined in view of the entire record. *Id.* However, Appellant has the burden on appeal to the Board to demonstrate error in the Examiner's position. *See In re Kahn*, 441 F.3d 977, 985-86 (Fed. Cir. 2006) ("On appeal to the Board, an applicant can overcome a rejection [under § 103] by showing insufficient evidence of *prima facie* obviousness or by rebutting the *prima facie* case with evidence of secondary indicia of nonobviousness.") (quoting *In re Rouffet*, 149 F.3d 1350, 1355 (Fed. Cir. 1998)).

FINDINGS OF FACT

The following findings of fact are supported by a preponderance of the evidence.

The Invention

1. As depicted in Figure 3, Appellant invented a DC/DC voltage converter (66) having a first power supply circuit (100) and a second power supply circuit (102) connected in parallel for converting an input voltage into an output voltage. (Spec. 21.)

2. The voltage converter (66) further includes a detecting circuit⁴ (140) to selectively activate one of the power supply circuits (100, 102) based on the amount of current supplied to the power supply circuits. (*Id.* 30.)

The Prior Art Relied Upon

⁴ The detecting circuit includes a current-sense amplifier (122) and a resistance (RS) for detecting the amount of current flowing through each power supply circuit. (*Id.* 28). The current-sense amplifier converts the detected current into a detection voltage across resistance R1. The comparator (124) compares the detection voltage ($R1 * I_L$) with a reference voltage (V_{ref}). If the detection voltage is lower than the reference voltage (i.e. $I_L < I_{ref}$), the output of the comparator is driven high, and the first power supply circuit (100) is activated while the second power supply circuit (102) is deactivated. Conversely, if the detection voltage is higher than the reference voltage, the output of the comparator is driven low (i.e. $I_L > I_{ref}$), and the second power supply circuit (102) is activated while the first power supply circuit (100) is deactivated. (*Id.* 30.)

3. As shown in Figure 1, Ferry discloses a voltage regulator (10) having two blocks (11, 12) arranged in parallel for respectively controlling the output of transistors (MP, MN). The first block (11) is meant to control the transistors in a switched-mode power supply mode while the second block (12) is meant to control the transistors in a linear regulatory mode. (Col. 4, ll. 30-42.)

4. The voltage regulator also includes a control circuit (13) for selecting the suitable mode for controlling the transistors according to the voltage available across the rechargeable battery, and preferably according to the amount of current that a load⁵ consumes. (Col. 3, ll. 22-26, ll. 39-41, col. 6, ll. 21-24, ll. 45-47.)

5. The switched-mode power supply component is selected when the voltage difference between the battery voltage and the output voltage is greater than a first predetermined threshold value (i.e. the current value consumed by load is higher than predetermined threshold value.) (Col. 4, ll. 42-48, col. 3, ll. 42-50, col. 6, 3-6.)

6. The linear mode power supply component is selected when the voltage difference between the battery voltage and the output voltage is lower than a first predetermined threshold value (i.e. current consumed by load is lower than predetermined threshold value). (Col. 3, ll. 35-38, col. 6, ll. 1-3.)

⁵ The load consists of the two capacitors (C and C') arranged in parallel at terminal S to yield the load supply voltage Vout. (Col. 4, ll. 45-49.)

7. As depicted in Figure 5, Schaffer discloses a current sense amplifier for detecting the magnitude and polarity of a current flowing from a battery (44) to a load (46). The circuit outputs a current proportional to the absolute value of the load. The output current can be easily converted to an output voltage by adding an output resistor from the output current to the ground. (Col. 8, ll. 19-25, ll. 35-36.)

ANALYSIS

We begin our analysis by noting that independent claim 6 recites a detecting circuit for activating a first power supply circuit or a second power supply circuit based on an amount of current supplied to the first and second power supply circuits. (App. Br., Claim Appendix.) We find that the combined disclosures of Ferry and Schaffer do not reasonably teach this limitation.

As detailed in the Findings of Fact section above, we have found that Ferry, similarly to the claimed invention, discloses a voltage regulator including two power supply block circuits arranged in parallel for controlling the output transistors in a switched mode or in a linear regulatory mode. (Finding 3.) We have also found that, similarly to the claimed invention, Ferry discloses a controller for selectively activating either of the two power supply blocks to control the transistors in a corresponding mode. (Finding 4.) We have found, however, that Ferry discloses activating either

of the power supply blocks based upon the current consumed by the load. (Findings 4-6.) Further, we have found no indication in Ferry that the current flowing through the load is somehow used by the control circuit in selecting the power supply blocks.⁶ Additionally, we have found that Schaffer is limited to detecting the amplitude of a current as it flows from a battery to a load. (Finding 7.) Therefore, we find that one of ordinary skill would have readily recognized that Ferry's apparatus, taken in combination with Schaffer's disclosure, would not have *predictably* resulted in a detecting circuit for activating either the first power supply circuit or a second power supply circuit based on an amount of current supplied to the first and second power supply circuits. We thus agree with Appellant that the ordinarily skilled artisan would not have combined the teachings of Ferry and Schaffer to teach the detecting circuit as claimed. We therefore conclude that even though the combination of Ferry and Schaffer teaches a controller

⁶ We appreciate the Examiner's position, *supra* note 2, that the signal [TU] across the battery is used to drive the power supply circuit blocks. We note, however, that even though TU serves as one of the inputs to the controller, we have no way of determining from Ferry's disclosure what relationship exists between TU and elements 18 and 19 (outputs of the controller and inputs to the circuit blocks). Further, we note that TU cannot by itself be determinative of the selection of a power supply circuit block since Ferry explicitly states that the activation of either of the circuit blocks depends on whether the amplitude of the load current is higher or lower than a reference value. To somehow construe the current in the load as being determinative of the amount of current supplied to both circuit blocks would require us to resort to speculation and strain the reference's teachings beyond reasonable limits.

for switching between the power supply modes by selecting a corresponding circuit block, it fails to teach or suggest that the controller activates such circuit block based on the current supplied to said first and second circuit blocks. It follows that the Examiner erred in rejecting claims 6 through 10, 12 and 13 as being unpatentable over the combination of Ferry and Schaffer.

CONCLUSION OF LAW

On the record before us, Appellant has shown that the Examiner failed to establish that the combined disclosures of Ferry and Schaffer render claims 6 through 10, 12, and 13 unpatentable under 35 U.S.C. § 103(a).

DECISION

We have reversed the Examiner's decision rejecting claims 6 through 10, 12, and 13.

REVERSED

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